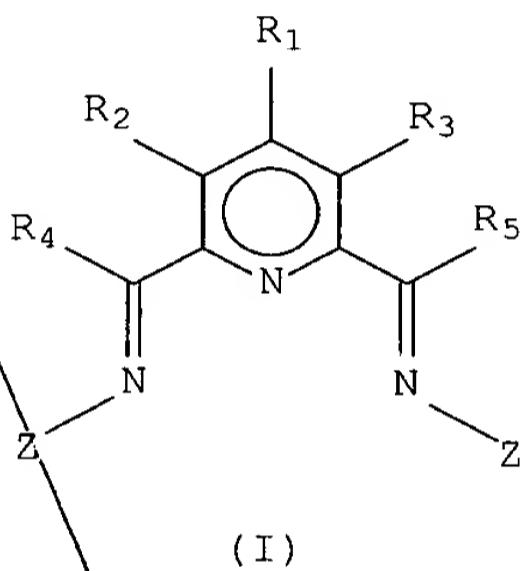


WE CLAIM:

1. A process for production of higher linear alpha olefins and/or alkyl-branched alpha olefins, which comprises the co-oligomerisation of one or more alpha olefins with ethylene in the presence of a metal catalyst system employing one or more bis-aryliminepyridine MX_a complexes and/or one or more [bis-aryliminepyridine $MY_p \cdot L_b^+ [NC^-]_q$] complexes, said bis-aryliminepyridine complexes comprising a ligand of the formula,

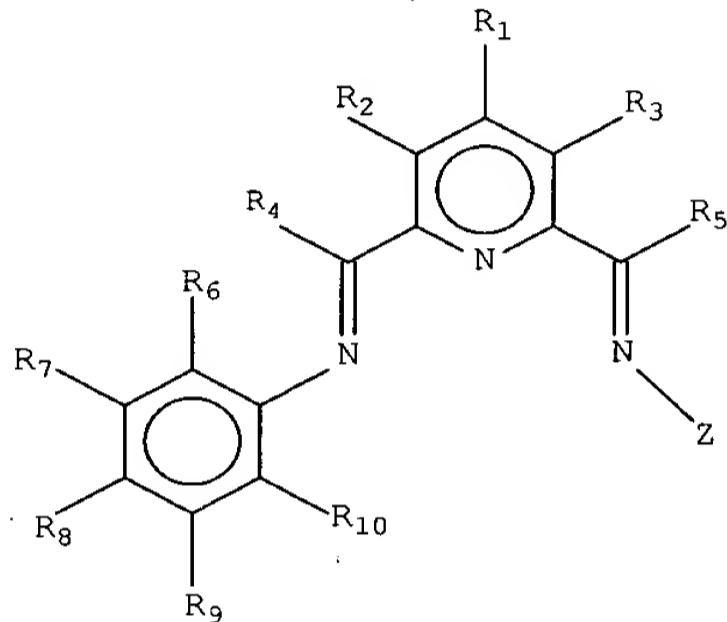


wherein M is a metal atom selected from Fe or Co; a is 2 or 3; X is halide, optionally substituted hydrocarbyl, alkoxide, amide, or hydride; Y is a ligand which may insert an olefin; NC^- is a non-coordinating anion; $p+q$ is 2 or 3, matching the formal oxidation of said metal atom; L is a neutral Lewis donor molecule; $b = 0, 1, \text{ or } 2$; $R_1 - R_5$ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of $R_1 - R_3$ vicinal to one another taken together may form a ring; each Z, which may be identical or different, is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic

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hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being π -co-ordinated to the metal; and said process is carried out at an ethylene pressure of less than 2.5 MPa.

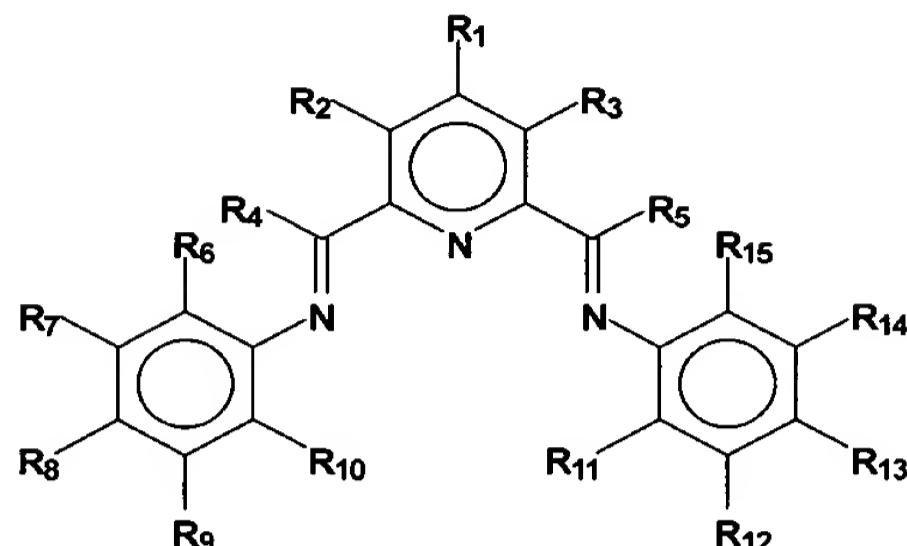
2. The process of Claim 1 wherein said ligand is of the formula,



(II)

wherein R₁-R₁₀ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R₁-R₃, R₆-R₁₀ vicinal to one another taken together may form a ring; R₆ may be taken together with R₄ to form a ring; R₁₀ may be taken together with R₄ to form a ring; Z is an optionally substituted aromatic hydrocarbon ring; an optionally substituted polyaromatic hydrocarbon moiety; an optionally substituted heterohydrocarbyl moiety; or an optionally substituted aromatic hydrocarbon ring in combination with a metal, said optionally substituted aromatic hydrocarbon ring being π -co-ordinated to the metal.

3. The process of Claim 1 wherein said ligand is of the formula,



(III)

wherein R₁-R₅, R₇-R₉ and R₁₂-R₁₄ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R₁-R₃, R₇-R₉ and R₁₂-R₁₄ vicinal to one another taken together may form a ring; R₆ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₇ or R₄ to form a ring; R₁₀ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₉ or R₄ to form a ring; R₁₁ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₅ or R₁₂ to form a ring; and R₁₅ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₅ or R₁₄ to form a ring.

4. The process of Claim 3 wherein R₁-R₅, R₇-R₉ and R₁₂-R₁₄ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or

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any two of R₁-R₃, R₇-R₉ and R₁₂-R₁₄ vicinal to one another taken together may form a ring; R₆ is a primary carbon group, a secondary carbon group or a tertiary carbon group; and provided that:

when R₆ is a primary carbon group none, one or two of R₁₀, R₁₁ and R₁₅ are primary carbon groups, and the remainder of R₁₀, R₁₁ and R₁₅ are hydrogen;

when R₆ is a secondary carbon group none or one of R₁₀, R₁₁ and R₁₅ is a primary carbon group or a secondary carbon group and the remainder of R₁₀, R₁₁ and R₁₅ are hydrogen;

when R₆ is a tertiary carbon group all of R₁₀, R₁₁ and R₁₅ are hydrogen; and

any two of R₆, R₇, R₈, R₉, R₁₀, R₁₁, R₁₂, R₁₃, R₁₄ and R₁₅ vicinal to one another, taken together may form a ring.

5. The process of Claim 3 wherein R₁-R₅, R₇-R₉ and R₁₂-R₁₄ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R₁-R₃, R₇-R₉ and R₁₂-R₁₄ vicinal to one another taken together may form a ring; R₆ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₇ or R₄ to form a ring; R₁₀ is hydrogen, optionally substituted hydrocarbyl, an inert functional group, or taken together with R₉ or R₄

to form a ring; R₁₁ and R₁₅ are, independently, hydrogen or an inert functional group.

6. The process of Claim 3 wherein R₁-R₅, R₇-R₉ and R₁₂-R₁₄ are each, independently, hydrogen, optionally substituted hydrocarbyl, an inert functional group, or any two of R₁-R₃, R₇-R₉ and R₁₂-R₁₄ vicinal to one another taken together may form a ring; R₆, R₁₀, R₁₁ and R₁₅ are identical and are each selected from fluorine or chlorine.

~~7. The process of Claim 1 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.~~

8. The process of Claim 2 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.

9. The process of Claim 3 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.

10. The process of Claim 4 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.

11. The process of Claim 5 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.

12. The process of Claim 6 wherein alpha olefin co-monomer is generally present in a concentration of greater than 1 mol.l⁻¹.

13. A composition comprising linear alpha olefins and/or alkyl branched alpha olefins produced by the process of Claim 1.

14. The composition of Claim 13 wherein said alkyl-branched alpha olefins are methyl- and/or ethyl-branched alpha olefins.

~~15.~~ A composition comprising linear alpha olefins and/or alkyl-branched alpha olefins, wherein said composition contains greater than 5 % wt. alkyl-branched alpha olefins based on the total weight of linear alpha olefins and alkyl-branched alpha olefins in the product composition.

16. The composition of Claim 15 wherein said allyl-branched alpha olefins are methyl- and/or ethyl branched alpha olefins.

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